

Warm up: worksheet in notes from yesterday, #2.
Assume conditions met

2) A grocery store manager wishes to determine whether a certain product will sell equally well in any of five locations the store. Five displays are set up, and the resulting numbers of the product sold are 43, 29, 52, 34, and 48. Is there enough evidence that the location makes a difference? Test at the 5% significance level.

Worksheet in notes

#2:

H₀: the distribution of products sold at each location is uniform

H_a: the distribution of products sold at each location is not uniform

Conditions:

- | | |
|-----------------------------|------------------------------------|
| 1) categorical data | 1) store locations are categorical |
| 2) SRS | 2) assumed representative |
| 3) expected counts ≥ 5 | 3) all exp. = 41.2 ≥ 5 |

$n = \frac{206}{5}$

conditions met --> χ^2 distribution --> χ^2 GOF test

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = \frac{(43 - 41.2)^2}{41.2} + \frac{(29 - 41.2)^2}{41.2} + \dots = 8.903$$

$$P(\chi^2 > 8.903 | df = 4) = 0.0636$$

We fail to reject H_0 b/c p-value of 0.0636 > alpha = 0.05.
 We have sufficient evidence that the distribution of products sold at each location is uniform.

Worksheet in notes

#1:

H₀: the distribution of education majors at VT fits the given percentages

H_a: the distribution of education majors at VT doesn't fit the given percentages

Conditions:

- | | |
|-----------------------------|---|
| 1) categorical data | 1) ed. majors are categorical |
| 2) SRS | 2) stated random sample |
| 3) expected counts ≥ 5 | 3) 38.5, 23.1, 7.7, 30.8, 15.4 ≥ 5 |

conditions met --> χ^2 distribution --> χ^2 GOF test

$$\chi^2 = \sum \frac{(\text{obs} - \text{exp})^2}{\text{exp}} = \frac{(40 - 38.5)^2}{38.5} + \frac{(20 - 23.1)^2}{23.1} + \dots = 2.515$$

$$P(\chi^2 > 2.515 | df = 7) = 0.926$$

We fail to reject H_0 b/c p-value of $0.926 > \alpha = 0.05$.

We have sufficient evidence that the distribution of education majors fits the percentages given, and has not changed.

p.643 #5 & 6

5) (a) the χ^2 is not appropriate because the data is not categorical. Weights are quantitative.

(b) We could count the # of each nut in the can. Then we could use the χ^2 test.

6) Mileage is a quantitative variable, not categorical, so we cannot use the χ^2 distribution and test